STUDIES IN POTENTILLA
I. KEY TO NORTH AMERICAN SECTIONS

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Potentilla Linnaeus is in the family Rosaceae, subfamily Rosoideae, tribe Potentillinae, subtribe Potentilleae. In the sense of its latest monographer (Wolf 1908), the genus Potentilla contains the species of this subtribe that have 10 to indefinite stamens attached near the base of the carpophore, which does not become conspicuously fleshy in fruit. This is the broad concept of the genus which in the past has been the most often used in Europe and in America.

Rydberg (1898, 1908), the leading American taxonomist of the genus, distinguished several genera from Potentilla that had been included in it by Wolf and his predecessors, including Lehmann (1856). These segregate genera are: Argentina (A. anserina), Comarum (C. palustre), Drymocallis (D. glandulosa, D. fissa, etc.), Pentaphylloides (P. fruticosa, P. floribunda, etc.), and Sibbaldiopsis (S. tridentata). Rydberg actually used the name Dasiphora for what is now called Pentaphylloides. In recent years, as the segregates advocated by Rydberg have begun to be re-examined, several taxonomists have confirmed their value as genera (Dansereau 1955, Weber 1976). Others have returned to the European and pre-Rydberg American treatment of Potentilla in the broad sense, apparently for reasons of convention and tradition alone (Keck 1938). The genera advocated by Rydberg are for the most part distinct on the basis of several, consistent floral and vegetative characters. Investigation into their modes of reproduction confirms their distinction.

Pentaphylloides and Sibbaldiopsis are shrubs or subshrubs with pubescent achenes and styles attached basally to the achene (Löve 1954). Drymocallis are large plants with large, pinnate leaves and basal styles. Argentina has lateral styles and interruptedly-pinnate, bicolored leaves, often a stoloniferous habit, and a chemistry that is unique in the Rosaceae (Bate-Smith 1962). Comarum has large, red flowers, lateral styles, inhabits bogs, and has a receptacle that becomes somewhat spongy in fruit; Comarum was accepted as a genus by Linnaeus.

Pentaphylloides is monoecious or functionally semi-dioecious. Pentaphylloides, Sibbaldiopsis, and Drymocallis are predominantly diploid ($\bar{x} = 7$) with rare tetraploid or hexaploid populations (Clausen et al. 1940). Argentina is predominantly tetraploid with rare hexaploid populations (Rousi 1965). Comarum has been reported to have tetraploid and hexaploid plants.

Fragaria is closely related to Potentilla sensu stricto, differing from it only in the formation of a fleshy carpophore, yet in Fragaria no apospory or parthenogenesis have been reported; these phenomena are widespread and common in Potentilla s.s. (Rutishauser 1948). Excluding vegetative reproduction, Drymocallis, Pentaphylloides, and Argentina are (as far as known) completely sexual (Fryxell 1957), similar to Fragaria. Several sucessful crosses have been made between Fragaria as female parent, and Pentaphylloides, Comarum, and Drymocallis as male parents. But no crosses have yet

been successful between Fragaria and Potentilla s.s. (Asker 1969). As Rydberg pointed out years ago, if genera such as Drymocallis, Sibbaldiopsis, and Ivesia are included in Potentilla, then the only logical course would be to also include Sibbaldia, Duchesnea, and Fragaria.

The type species of Potentilla is P. reptans, a subdigitate, stoloniferous species from northern Europe, north Africa, the Middle East, and central Asia (Rydberg 1910). In this treatment, Potentilla is taken in the sense of Rydberg (1908), which see for a key to genera in this subtribe.

Rydberg (1896, 1897, 1898) divided Potentilla into 21 "groups." These are equivalent to sections as presently used, since they are the only taxonomic level used between the genus and its species, and Rydberg used the paragraph symbol (§) to refer to them, as was common for sections in his day. They were all given a short description, and named in a manner analogous to Lehmann's (1856) "tribes," that is, they were named after one of the species in the group.

POTENTILLA Linnaeus, Species Plantarum 495 (1753). Rydberg, Mem. Dept. Bot. Columbia Univ. 2:20 (1898). Rydberg, North Amer. Flora 22(4):293 (1908). Yuzepchuk, Flora SSSR 10:78 (1941). Type species: P. reptans Linnaeus.

Potentilla L. sensu Nestler, Monogr. Potent. 22 (1816). Lehmann, Monogr. Gen. Potent. 19 (1820). Lehmann, Revis. Potent. 1 (1856). Wolf, Monogr. Gatt. Potent. 15 (1908), exclud. Pentaphylloides, Duchesnea, Argentina, Comarum, Drymocallis, and Sibbaldiopsis.

KEY TO THE NORTH AMERICAN SECTIONS

1. Flowers solitary in the axils of stem leaves, with long pedicels; stems often either modified into stolons or rooting at the nodes or decumbent. Moist woods, eastern Canada to New Mexico, south to Georgia, Texas, and northwest Mexico ..... 1. Sect. Potentilla
1. Flowers principally in terminal cymes, rarely also in the axils of lower leaves; stems sometimes decumbent, but never stoloniferous or rooting at the nodes. Generally distributed in North America ..... (2)

2. Stems branched below the middle, with well-developed leaves subtending most branches, at flowering time with the principal well-developed and largest leaves at about midstem and with short petioles; often at flowering time with the basal rosette long past functioning in photosynthesis and not prominent; style 1.0 mm long or shorter, conspicuously incrassate at base, coniform; plants annual or short-lived perennial, often with weedy tendencies ..... (3)
2. Stems branched below the middle or not, usually with well-developed leaves only basally, leaves sharply or gradually reduced upward in size or number of parts; if stems leafy, then stem leaves definitely smaller than basal leaves, at flowering time with mature basal leaves often on long petioles; style 0.8-4.5 mm long, incrassate or not; plants perennial, often with woody rootstock ..... (6)

3. Bracteoles of the calyx usually 3-lobed; leaves pilose with straight hair, never tomentose nor glandular; plants biennial to short-lived perennial. Guatemala ..... 2. Sect. Heterosepalae
3. Bracteoles always entire; leaves either tomentose below or conspicuously glandular; plants annual to short-lived perennial ..... (4)

4. Plants annual; leaves strigose and conspicuously glandular, often sticky, never tomentose; digitate or pinnate. Wet meadows and streamside strand, most of North America at submontane elevations ..... (5)
4. Plants biennial or short-lived perennial; leaves conspicuously white-tomentose beneath, small, digitate, dissected into narrow lobes. Adventive from Europe: east and west coasts of North America, and scattered through interior ..... 3. Sect. Argenteae

5. Leaves conspicuously pinnate with 7-21 leaflets, the leaflets deeply dissected digitately to near the base into obtuse-crenate segments. Stems of light color (often white), decumbent, hollow, silky-strigose and usually glandular. Southeastern Washington, eastern Oregon, and northeastern California ..... 4. Sect. Arenicolae
5. Leaves conspicuously digitate to subpinnate, with 3-5 leaflets, rarely with 7 leaflets, the leaflets shallowly toothed to coarsely toothed, never deeply divided; stems usually green, often erect (except in depressed forms), villous and often glandular. Western North America, Europe, and Asia ..... 5. Sect. Supinae

6. Style 1.0 mm long or shorter, often conical, often thickened at the base and tapered to the stigma, relatively thick just below the stigma ..... (7)
6. Style 1.2 mm long or (often much) longer, usually thin just below the stigma ..... (10)

7. Tall, strictly erect plants, with harsh-spreading pubescence visible without magnification, pubescence bristly-hirsute; pedicels strictly straight. Leaves strictly digitate, light yellow-green. Introduced from Eurasia: northeastern United States, southeastern Canada, and midwestern and Great Plains states and provinces, scattered westward ..... 6. Sect. Rectae
7. Plants usually ascending to decumbent, short- to medium-sized; pedicels usually more or less arcuate-ascending or less commonly recurved. Leaves digitate or pinnate, either with some tomentum beneath (sometimes densely and conspicuously so) or not, but in any case not with harsh, bristly-hirsute pubescence. Generally distributed ..... (8)

8. Style claviform (thickened prominently just below the stigma); leaves sericeous or glabrous, usually green or yellowish-green, never tomentose. Arctic-alpine species of eastern North America.. 7. Sect. Aureae
8. Style uniformly-thickened or filiform; leaves tomentose at least beneath. Generally distributed; sometimes arctic, but if alpine then principally western North America ..... (9)

9. Leaves almost always digitate, often ternate, rarely subdigitate, with flat margins; arctic and alpine North America, never subalpine. Style often uniformly thickened; pubescence usually snow-white and formed of long entangled hair; stem short, decumbent to ascending .. 8. Sect. Niveae
9. Leaves pinnate to (less commonly) subdigitate, leaflets with revolute margins; plants sometimes arctic or alpine but then either clearly pinnate or with erect-ascending stems or with off-color pubescence. Pubescence snow-white only in one uncommon subarctic species of Alaska and Yukon with highly-dissected leaflets, otherwise greenish, yellowish, or formed of shorter matted hair; stems often tall (especially at lower elevations and latitudes), often ascending to erect ..... 9. Sect. Multifidae

10. Leaves small, with petioles often less than 5 cm long, 5-7-digitate or 5-7-subdigitate, tawny or yellowish-tomentose beneath (rarely snow-white tomentose, very rarely without tomentum), always strigose above and on petioles and calyx, commonly also glandular, the strigae

stiff and sometimes pustulose-based; style 1.6-2.4 mm long, claviform (with the thickest portion just below the stigma); stems usually prostrate or decumbent, 3-7-flowered, often flowering in early spring; calyx lobes and bracteoles of the same texture, blunt-acute or obtuse, the calyx usually broader than long. Dry hills, western Great Plains and Great Basin to the alpine in the southern Rocky Mountains ..... 10. Sect. Concinnae

10. Leaves small to large, digitate to pinnate, tomentose or not, if strigose usually not also tomentose, seldom glandular but then without tomentum; style 1.8-4.0 mm long, if thickened then at the base, or if claviform then without tomentum in eastern arctic-alpine species. Stems prostrate to erect, 3-50-flowered; calyx lobes often acuminate (at least in fruit), bracteoles sometimes of different texture. Generally distributed ..... (11)

11. Leaves, and often stems and calyces, densely viscid-glandular, often also sericeous, strigose, or hispid, never tomentose; leaves digitate or trifoliolate. Southwestern United States and northwestern Mexico, or alpine in Pacific Northwest and central Mexico ..... (12)

11. Leaves tomentose, sericeous, strigose, or rarely hispid, never prominently (nor densely) glandular. Leaves digitate or pinnate, less commonly trifoliolate. Generally distributed ..... (14)

12. Leaves trifoliolate, but the terminal leaflet dissected pinnately into crenate lobes, the leaf appearing pinnate with 5-7 leaflets; leaves glandular-puberulent, dark green, turning darker in drying. Alpine of Pacific Northwest and central Mexico. 11. Sect. Brevifoliae

12. Leaves pinnate to digitate, sometimes trifoliolate but then with three evident leaflets; leaves stalked-glandular, often viscid-glandular, often hispid or villous in addition. Low elevations, southwestern United States and northwestern Mexico ..... (13)

13. Leaves plainly pinnate with 5-15 leaflets, the leaflets sometimes flabellate; stems 5-30 cm long, prostrate to ascending; petals sometimes acute. Cliffs of desert mountains, southeastern California, southwestern Arizona and adjacent Nevada, Baja California, and Sonora ..... 12. Sect. Saxosae

13. Leaves digitate with 5 leaflets or less commonly trifoliolate, the leaflets rarely flabellate; stems 5-50 cm long, ascending to more often surculose-spreading; petals emarginate. Dry slopes, southwestern United States and northwestern Mexico ..... 13. Sect. Subviscosae

14. Leaves pinnate to digitate, tomentose, strigose, sericeous, or glabrous; if digitate or subdigitate then either glabrous to sericeous (but not tomentose) in plants of the alpine of the Rocky Mountains, Great Basin ranges, and northern Cascades, or else slightly subdigitate and conspicuously tomentose beneath in plants of the eastern Great Plains, Rocky Mountains, and Great Beasin; styles long-filiform, if thickened then slightly so at very base only ..... (15)

14. Leaves strongly digitate or ternate, usually tomentose but if subglabrous then ternate, if otherwise not tomentose then either with hairy receptacle or else leaves densely sericeous-villous or else subalpine in central and northern Mexico ..... (16)

15. Leaves pinnate to digitate, glabrous, strigose, sericeous, or tomentose, but if digitate or subdigitate then glabrous-sericeous in alpine (or rarely subalpine) plants of the Rocky Mountains, Great Basin ranges, and northern Cascades; stems usually short and ascending, sometimes tall, but if tall, then leaves glabrous to subglabrous; if tomentose then leaflets verticillate, the terminal one lobed ..... 14. Sect. Multijugae

15. Leaves pinnate to digitate, tomentose to less commonly strigose or hispid; if subdigitate then leaves conspicuously tomentose in erect (often tall) plants; if strigose or hispid then either glandular in addition in plants of Arizona or adjacent parts of adjoining states, or else leaflets conspicuously confluent in tall plants of the Front Ranges from southern Wyoming to New Mexico; if plants tall then clearly tomentose .....15. Sect. Subjugae

16. Receptacle hairy; leaves digitate, each leaflet dissected nearly to the base into long narrow segments; plants with woody caudex, low stems with few flowers. Central and northern subarctic mountains of Alaska, Yukon, and Mackenzie; Siberia ..... 16. Sect. Biflorae
16. Receptacle not hairy; leaves digitate or ternate, usually merely toothed; plants perennial, stems often tall and many-flowered. Low elevations and lower latitudes, western North America including Mexico ..... (17)

17. Leaves ternate, leaflets flabelliform and the terminal one petiolulate, glabrous to puberulent. Mountains of central Sierra Nevada to southern British Columbia ..... 7. Sect. Aureae
17. Leaves digitately 5-7(-9)-foliolate, rarely flabelliform, usually sessile, often tomentose or otherwise pubescent. Generally distributed .... (18)

18. Petals red or brown ..... 18. Sect. Haematochroi
18. Petals yellow ..... (19)

19. Leaflets thick and leathery, caudex thick. Central Mexico to Guatemala; styles filiform above, thickened near base ..... 19. Sect. Ranunculoides
19. Leaflets thinner, nearly always tomentose; style thickened uniformly up to about half its length, then tapered abruptly, becoming filiform just below the stigma; tall plants with erect to ascending stems. West of the Sierra Nevada in California, west of the Rocky Mountains in northwestern United States and southwestern Canada; if densely tomentose then strictly digitate and west of the Sierra Nevada and Cascades .. 20. Sect. Graciles

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1. Sect. POTENTILLA. Lectotype: P. reptans L. (Rydberg 1910:375-376).

Potentilla L., Spec. Plant. 495 (1753). Gen. Plant. V, 219 (1754). Quinquefolium Tourn., Inst. Rei Herb. 1:296-297 t.153 (1700). Tourn. ex Adans., Fam. Plant. 2:295 (1763). Potentilla sect. Quinquefolium (Tourn.) Poeverlein in Aschers. & Graebn., Syn. Mitteleur. 6:669 (1904). Lectotype: P. reptans L. (Rydberg 1910:375-376).

Tormentilla Tourn., Inst. Rei Herb. 1:298 t.153 (1700). L., Spec. Plant. 500 (1753). L., Gen. Plant. V, 219 (1754). Potentilla sect. Tormentillae Lehm., Rev. Potent. 8, 174 (1856). Group Tormentillae (Lehm.) Rydb., Bull. Torrey Bot. Club 24:10 (1897). Sect. Tormentillae (Lehm.) Poeverlein in Aschers. & Graebn., Syn. Mitteleur. 6:669 (1904). Grex Tormentillae (Lehm.) Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6:832 (1904). Lectotype: T. erecta L. (Rydberg 1910: 376).

Potentilla sect. Reptantes Lehm., Rev. Potent. 8, 178 (1756). Type: P. reptans L.

NORTH AMERICAN SPECIES

P. anglica Laich.
P. canadensis L.
P. carolinensis Poir. in Lam.
P. erecta (L.) Rausch
P. exsul Standl.
P. pumila Poir. in Lam.
P. reptans L.
P. simplex Michx.

2. Sect. HETEROSEPALAE (Rydberg) B. C. Johnston, stat. nov.

Group Heterosepalae Rydb., Mem. Dept. Bot. Columbia Univ. 2:23,39 (1898). Rydb., North Amer. Flora 22(4):303 (1908). Type: P. heterosepala Fritsch.

NORTH AMERICAN SPECIES

P. heterosepala Fritsch

3. Sect. ARGENTEAE (Lehm.) Yuzepchuk, Fl. SSSR 10:144 (1941).

Subtribe Argenteae Lehm., Rev. Potent. 6,93 (1856). Group Argenteae (Lehm.) Rydb., Bull. Torrey Bot. Club 24:9 (1897). Grex Argenteae Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6:704,670 (1904). Type: P. argentea L.

NORTH AMERICAN SPECIES

P. argentea L.

4. Sect. ARENICOLAE (Rydberg) B. C. Johnston, stat. nov.

Group Arenicolae Rydb., Mem. Dept. Bot. Columbia Univ. 2:31,111 (1898). Rydb., North Amer. Flora 22(4):308 (1908). Type: P. newberryi A. Gray (var. arenicola Rydb. = var. newberryi).

NORTH AMERICAN SPECIES

P. newberryi A. Gray

5. Sect. SUPINAE (Lehmann) B. C. Johnston, stat. nov.

Series Supinae Lehm., Rev. Potent. 8,191 (1856). Group Supinae (Lehm.) Rydb., Mem. Dept. Bot. Columbia Univ. 2:23,40 (1898). Type: P. supina L.
Series Pentandra Lehm., Rev. Potent. 8,197 (1856). Type: P. pentandra Engelm. ex Torr. & Gray.
Series Boreales Lehm., Rev. Potent. 8,198 (1856). Type not inferred or named; probably P. norvegica L.
Section Rivales Poeverlein in Aschers. & Graebn., Syn. Mitteleur. 6:669 (1904). Grex Rivales Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6:670,744 (1904). Type: P. rivalis Nutt. ex Torr. & Gray.

NORTH AMERICAN SPECIES

P. biennis Greene
P. intermedia L.
P. norvegica L.
P. paradoxa Nutt. ex T. & G.
P. pentandra Engelm. ex T. & G.
P. rivalis Nutt. ex T. & G.

6. Sect. RECTAE (Lehm.) Yuzepchuk, Fl. SSSR 10:160 (1941).

Subtribe Rectae Lehm., Rev. Potent. 5-6,81 (1856). Grex Rectae Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6:671,750 (1904). Group Rectae Rydb., North Amer. Flora 22(4):309 (1908). Type: P. recta L.

NORTH AMERICAN SPECIES

P. recta L.

7. Sect. AUREAE (Lehm.) Yuzepchuk, Fl. SSSR 10:197 (1941).

Tribus Aureae Lehm., Rev. Potent. 6,112 (1856). Group Aureae (Lehm.) Rydb., Bull. Torrey Bot. Club 23:394 (1896). Grex Aureae (Lehm.) Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6:671,786 (1904). Type: P. aurea L.

Subtribus Fragiformes Lehm., Rev. Potent. 7,153 (1856). Type: P. fragiformis Willd. ex Schlecht.

Tribus Frigidae Lehm., Rev. Potent. 7,153 (1856). Group Frigidae (Lehm.) Rydb., Bull. Torrey Bot. Club 23:301,304 (1896). Subsect. Frigidae (Lehm.) Yuzepchuk, Fl. SSSR 10:197 (1941). Type: P. frigida Vill.

Subtribus Nanae Lehm., Rev. Potent. 7,157 (1856). Type: P. nana Willd. ex Schlecht.

Subgrex Alpestres Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6:786 (1904). Subsect. Alpestres Yuzepchuk, Fl. SSSR 10:202 (1941). Type: P. alpestris Hall.f.

NORTH AMERICAN SPECIES

P. crantzii (Crantz) Beck
P. elegans Cham. & Schlecht.
P. flabellifolia Hook. ex T. & G.
P. fragiformis Willd. ex Schlecht.
P. grayi S. Wats.
P. sierrae-blancae Wooton & Rydb.
P. hyparctica Malte
P. nana Willd. ex Schlecht.
P. robbinsiana (Oakes ex Lehm.) Rydb.
P. rubella Th. Sorensen?

In addition, P. stipularis L. is adventive in North America and will key out here. It is in fact in Sect. Chrysanthae (Lehm.) Yuzep. Sect. Aureae in this broad sense, as above, probably should be split, perhaps into subsections, as in Wolf (1908).

8. Sect. NIVEAE (Lehm.) Yuzepchuk, Fl. SSSR 10:133 (1941).

Subtribus Niveae Lehm., Rev. Potent. 8,163 (1856). Group Niveae (Lehm.) Rydb., Bull. Torrey Bot. Club 23:301 (1896). Grex Niveae (Lehm.) Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6:670,703 (1904). Type: P. nivea L.

NORTH AMERICAN SPECIES

P. hookeriana Lehm.
P. nivea L.
P. unifflora Ledeb.
P. vahliana Lehm.
P. villosa Pall. ex Pursh

9. Sect. MULTIFIDAE (Lehm.) Yuzepchuk, Fl. SSSR 10:113 (1941).

Tribus Multifidae Lehm., Rev. Potent. 4,26 (1856). Group Multifidae (Lehm.) Rydb., Bull. Torrey Bot. Club 23:262 (1896). Grex Multifidae (Lehm.) Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6: 670-698 (1904). Type: P. multifida L.

Group Rubricaules Rydb., Mem. Dept. Bot. Columbia Univ. 2:30,100 (1898), exclud. descriptions and specimens cited. Most of what Rydberg called Rubricaules is now included in Sect. Subjugae.

Sect. Pennsylvanicae Poeverlein in Aschers. & Graebn., Syn. Mitteleur. 6:669 (1904). No species or specimens cited. Type is probably P. pensylvanica L.

NORTH AMERICAN SPECIES

P. bipinnatifida Dougl. ex Hook.
P. pectinata Raf.
P. multifida L.
P. pensylvanica L.
P. pulchella R. Br.
P. rubricaulis Lehm.

10. Sect. CONCINNAE (Rydberg) B. C. Johnston, stat. nov.

Group Concinnae (Rydb.), Bull. Torrey Bot. Club 23:431 (1896). Rydb., Mem. Dept. Bot. Columbia Univ. 2:24,52 (1898). Rydb., North Amer. Flora 22(4):328 (1908). Type: P. concinna Richardson.

NORTH AMERICAN SPECIES

P. concinna Richardson
P. leonina Standl.?

11. Sect. BREVIFOLIAE (Rydberg) B. C. Johnston, stat. nov.

Group Brevifoliae Rydb., Mem. Dept. Bot. Columbia Univ. 2:30,104 (1898). Rydb., North Amer. Flora 22(4):336 (1908). Type: P. brevifolia Nutt. ex Torrey & Gray.

NORTH AMERICAN SPECIES

P. brevifolia Nutt. ex T. & G.
P. richardii Lehm.

12. Sect. SAXOSAE (Rydberg) B. C. Johnston, stat. nov.

Group Saxosae Rydb., North Amer. Flora 22(4):335 (1908). Type: P. saxosa Lemmon.

NORTH AMERICAN SPECIES

P. acuminata H. M. Hall
P. rosulata Rydb.
P. saxosa Lemmon

13. Sect. SUBVISCOSAE (Rydberg) B. C. Johnston, stat. nov.

Group Subviscosae Rydb., Bull. Torrey Bot. Club 23:429 (1896). Rydb., Mem. Dept. Bot. Columbia Univ. 2:24-25,54 (1898). Rydb., North Amer. Flora 22(4):327 (1908). Type: P. subviscosa Greene.

NORTH AMERICAN SPECIES

P. albiflora L. O. Williams
P. mexiae Standl.
P. pinetorum Wiggins
P. subviscosa Greene
P. wheeleri S. Wats.

14. Sect. MULTIJUGAE (Rydb.) A. Nelson, Bull. Torrey Bot. Club 27:32 (1900).

Group Multijugae Rydb., Bull. Torrey Bot. Club 23:432 (1896). Grex Multijugae Th. Wolf., Bibliot. Bot. 16(71):51,488 (1908). Type: P. multijuga Lehm.

Group Candicantes Rydb., Mem. Dept. Bot. Columbia Univ. 2:32,118 (1898). Type: P. candicans H. B. ex Schlecht.

NORTH AMERICA SPECIES

P. breweri S. Wats.
P. candicans H. B. ex Schlecht.
P. diversifolia Lehm.
P. drummondii Lehm.
P. hickmanii Eastwood
P. millefolia Rydb.
P. multijuga Lehm.
P. multisecta (S. Wats.) Rydb.
P. ovina J. M. Macoun
P. plattensis Nutt. ex T. & G.

15. Sect. SUBJUGAE (Rydberg) B. C. Johnston, stat. nov.

Group Subjugae Rydb., Bull. Torrey Bot. Club 23:397 (1896). Rydb., Mem. Dept. Bot. Columbia Univ. 2:27,75 (1898). Rydb., North Amer. Flora 22(4):320 (1908). Type: P. subjuga Rydb.

Group Hippianae Rydb., Bull. Torrey Bot. Club 24:1 (1897). Untergruppe Hippianae (Rydb.) Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6: 701 (1904). Type: P. hippiana Lehm.
Group Leucophyllae Rydb., Mem. Dept. Bot. Columbia Univ. 2:31,112 (1898). Type: P. leucophylla Torrey, not Pallas.
Group Obovatifoliae Rydb., North Amer. Flora 22(4):321 (1908). Type: P. obovatifolia Rydb.

NORTH AMERICAN SPECIES

P. ambigens Greene
P. crinita A. Gray
P. effusa Dougl. ex Lehm.
P. hippiana Lehm.
P. macounii Rydb.
P. pulcherrima Lehm.
P. subjuga Rydb.

16. Sect. BIFLORAE (Rydb.) Schiman-Czeika in Rechinger, Fl. Iran 66:85 (1969)

Group Biflorae Rydb., Bull. Torrey Bot. Club 24:13 (1897). Grex Biflorae (Rydb.) Th. Wolf, Bibliot. Bot. 16(71):46,70 (1908). Type: P. biflora Willd. ex Schlecht.

NORTH AMERICAN SPECIES

P. biflora Willd. ex Schlecht.

17. Sect. HAEMATOCHRI (Rydberg) B. C. Johnston, stat. nov.

Group Haematochri Rydb., Bull. Torrey Bot. Club 24:10-11 (1897). Rydb., Mem. Dept. Bot. Columbia Univ. 2:22,32 (1898). Grex Haematochroae Th. Wolf in Aschers. & Graebn., Syn. Mitteleur. 6:702 (1904). Type: P. haematochrus Lehm.
Group Rubrae Rydb., North Amer. Flora 22(4):323 (1908). Type: P. rubra Willd. ex Schlecht.

NORTH AMERICAN SPECIES

P. comaroides H. B. ex Nestl.
P. ehrenbergiana Schlecht.
P. fusca Schlecht.
P. haematochrus Lehm.
P. lozani Rose & Painter
P. madrensis Rose
P. rubra Willd. ex Schlecht.
P. thurberi A. Gray

The rest of this fascinating section is distributed on the south slope of the Himalaya. This section needs revision of its species.

18. Sect. RANUNCULOIDES (Th. Wolf) Yuzepchuk, Fl. SSSR 10:193 (1941).

Grex Ranunculoides Th. Wolf, Bibliot. Bot. 16(71):51,503 (early 1908). Type: P. ranunculoides H. B. ex Nestler.
Group Heptaphyllae Rydb., North Amer. Flora 22(4):310 (Nov. 1908). Type: P. leptophylla Rydb. (= P. palmeri Th. Wolf), based on P. heptaphylla Rydb., not P. heptaphylla L. Hence, this is not based on the same type as Series Heptaphyllae Yuzepchuk (1941)
Group Subcoriaceae Rydb., North Amer. Flora 22(4):320 (1908). Type: P. subcoriacea Rydb.
Group Horridae Rydb., North American Flora 22(4):322 (1908). Type: P. horrida Rydb.

NORTH AMERICAN SPECIES

P. durangensis Rydb.
P. goldmanii Painter ex Rydb.
P. ranunculoides H. B. ex Nestl.
P. horrida Rydb.
P. leptopetala Lehm.
P. oaxacana Rydb.
P. palmeri Th. Wolf
P. pringlei S. Wats.
P. rydbergiana Rose
P. macrorhiza Willd.?
P. subcoriacea Rydb.
P. hiemalis Schlecht. & Cham.
P. townsendii Rydb.

This poorly-understood section is in many ways the Mexican equivalent of Sect. Graciles, with many of the same complexities.

19. Sect. GRACILES (Rydb.) A. Nelson, Bull. Torrey Bot. Club 26:480 (1899).

Group Graciles Rydb., Bull. Torrey Bot. Club 24:4 (1897). Grex Graciles Th. Wolf ex Aschers. & Graebn., Syn. Mitteleur. 6:701 (1904). Type: P. gracilis Dougl. ex Hook.
Group Nuttalliianae Rydb., North Amer. Flora 22(4):310 (1908). Type: P. nuttalliana Lehm.
Group Candidae Rydb., North Amer. Flora 22(4):310 (1908). Type: P. candida Rydb.
Group Permolles Rydb., North Amer. Flora 22(4):315 (1908). Type: P. permollis Rydb.
Group Longipedunculatae Rydb., North Amer. Flora 22(4);320 (1908). Type: P. longipedunculata Rydb.

NORTH AMERICAN SPECIES

P. flabelliformis Lehm.
P. gracilis Dougl. ex Hook.
P. pectinisecta Rydb.

In addition, P. sterilis (L.) Garke has been reported as adventive. It is in Sect. Fragariastrum (Ser.) B. Pawl.

SPECIES OF UNKNOWN SECTION

P. cespitosa Raf.: description sounds like P. robbinsiana, sect. Aureae, but that species is not otherwise known from the "Alleghenies," the cited locality.
P. ciliata Raf.: possibly a synonym of P. crantzii, sect. Aureae.
P. dissecta Pursh: uncertain species.
P. knoblochii Standl.: probably in Sect. Ranunculoides; no specimens seen.

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